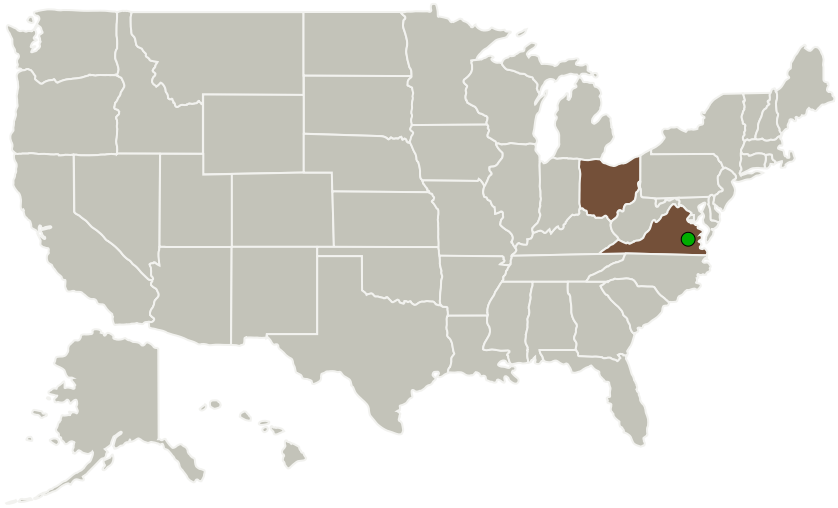
Multifunctional Self-Aligning Reversible Joint using Space-Qualifiable Structural Fasteners, Phase I

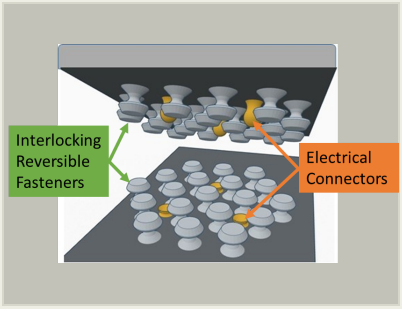
Completed Technology Project (2017 - 2017)

Project Introduction

Cornerstone Research Group (CRG) proposes the development of a multifunctional reversible attachment scheme to facilitate modular in-space construction. CRG will demonstrate a mechanically robust, easily reversible, self-aligning fastener system with integrated electrical connections. The proposed approach can be expanded to later include other types of integrated connections. Examples of other connectors could incorporate fluid flow or thermal load transfer. This state-of-the-art fastener system built on space-qualifiable thermoset shape memory polymer fasteners will be capable of >50 times assembly and disassembly using electrical power and embedded heaters providing NASA with a modular capability that can be used with autonomous assembly systems. Leveraging CRG's prior development work on shape memory polymer fastener systems, the proposed R&D herein will provide NASA with a multifunctional reversible attachment system with technology readiness level (TRL) of 3 at the conclusion of the Phase I effort.

Primary U.S. Work Locations and Key Partners





Multifunctional Self-Aligning Reversible Joint using Space-Qualifiable Structural Fasteners, Phase I Briefing Chart Image

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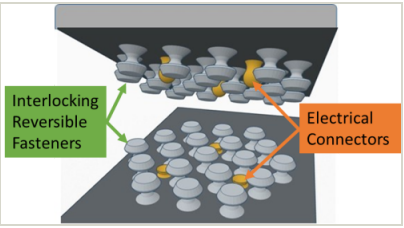
Organizations Performing Work	Role	Type	Location
Cornerstone Research Group, Inc.	Lead Organization	Industry	Miamisburg, Ohio
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Ohio	Virginia

Images



Briefing Chart Image
Multifunctional Self-Aligning Reversible Joint using Space-Qualifiable Structural Fasteners, Phase I Briefing Chart Image *(https://techport.nasa.gov/image/132416)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Cornerstone Research Group, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

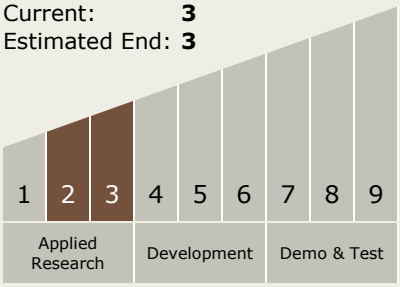
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Jason Hermiller

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.8 Smart Materials